

ON THE ANATOMY OF THE *HELIX AMPULLA* OF BENSON, AND  
ITS GENERIC POSITION IN THE ARIOPHANTINÆ.

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Read 11th January, 1901.

PLATE XVIII.

ARIOPHANTA (INDRELLA, n. subgen.) AMPULLA, Benson.

*Helix ampulla*, Bens.: Ann. & Mag. Nat. Hist., ser. II, vol. v (1850), p. 213; Reeve, Conch. Icon., fig. 736; Pfeiffer, Mon. Helic., vol. iii, p. 27, and vol. iv, p. 9; Hanley & Theobald, Conch. Indica, p. 13, pl. xxv, fig. 4.

*Paryphanta ampulla*, Bens.: Theobald, Cat. Land & Fresh-water Shells Brit. Ind., p. 17.

*Nanina ampulla*, Bens.: Nevill, Hand List Moll. Ind. Mus., p. 54.

*Panda ampulla*, Bens.: Albers, Die Heliceen, 1860, p. 149.

After many years of expectation, I have at length seen the animal of *Helix ampulla*, Benson, one of the largest and most interesting of the South Indian Land Mollusca. Both animal and shell are large and of handsome form and coloration. The systematic position of this species has long been very uncertain; in fact, ever since it was first discovered by Dr. T. C. Jerdon on the Khoorda Ghat in the Nilgiri Hills, and described by Benson in 1850. The latter says, "The shell bears very much the appearance of a large globular *Vitrina*, for which it has been taken, but the rough surface of the shell shows that it has been formed by an animal of very different organization, and its affinities place it near the singular and beautiful Helicophantoid Helices, *Waltoni*, of Ceylon, and *magnifica*, of Madagascar." Theobald placed it in *Paryphanta*. Nevill, when so very little was known of the animal, more appropriately in *Nanina*. The two specimens kindly placed in my hands by Dr. W. T. Blanford were obtained in Southern India, and we are again indebted to Dr. Thurston for collecting and sending home such well-preserved material for study.

It was Dr. W. T. Blanford who, in 1863, first noted the presence of a mucous gland. In Mr. Geoffrey Nevill's manuscript revised Hand List of the Shells in the Calcutta Museum it is stated, on the authority of Colonel Beddome, that the animal is yellow, and that there is a variety in the Wynaad of a distinct red colour, of which Colonel Beddome had sent two specimens to the Museum.

Dr. Blanford has also sent me an excellent drawing of the living animal, life-size, fully extended, that was executed very many years

ago under the direction of the late Sir Walter Elliot, who did so much able and valuable work in making known the fauna of Southern India. It looks like the work of a native artist, and shows the animal to be of a pale lemon yellow, with a well-fringed pallial margin to the foot. The accuracy of this drawing is very great, for the artist has shown the difference in colour between the shell with the animal inside it, very black, intensified by the very dark colour of the visceral sac, and the empty shell with its warm brown coloration. The specimen depicted was taken on "the coffee estates at the foot of the Gudalur Pass, near Nelialam." This drawing may, I think, originally have come from Dr. Jerdon; the handwriting looks like his, and the paper is exactly the size of that employed for the hundreds of drawings Dr. Jerdon had made about that time; and he and Elliot worked a great deal together.

*Description of the Spirit Specimens.*—The shell evidently does not cover the whole body of the animal; the head only, it would appear, could be withdrawn under the peristome. In both specimens the foot and dorsal lobes are of a rich orange colour, and the hardened mucous covering the body is of this colour, agreeing with the note made by Colonel Beddome mentioned above. The sole of the foot is greenish grey, and the first point that strikes one is its extremely smooth, even surface; there is no contraction on the median line in either specimen (and both have been put into rather strong spirit), as seen in that of *Ratnadvipia*.<sup>1</sup> There is only a slight crinkling on the margin bordering the smooth plane of the foot. So smooth a surface I have not seen before in any Indian species. A few very indistinct segmental lines are visible in the smallest specimen, but no sign of the longitudinal striation is to be observed as in some other South Indian and Ceylon species.

When the shell is removed, the difference between the very dark indigo colour of the integument covering the visceral sac and the much paler colour of the head and foot up to the mantle-zone is very striking, as shown in Sir Walter Elliot's drawing. The mucous pore is rather small; no overhanging process is seen in the spirit specimens, but in the drawing a slight indication of this is to be seen. On the pallial margin the usual parallel furrows are absent; the fringed margin is bounded at once by a grooved and wrinkled surface. There are no shell-lobes, the mantle edge is quite plain and hem-like. The right dorsal lobe is of the usual form; the left is divided above the central line of the neck, by a cut across its length, into anterior and posterior lobes. On the neck and head of the animal the grooves running from the eye tentacles backward, seen in some Indian genera, are absent; the general wrinkling of the body at this point resembles that of *Nilgiria Chenui*.<sup>2</sup>

*Generative Organs.*—The retractor muscle of the penis is attached to the lower wall of the branchial chamber at its extreme posterior end.

<sup>1</sup> Vide Land and Fresh-water Moll. Ind., pl. lxxxv, fig. 3.

<sup>2</sup> Vide Land and Fresh-water Moll. Ind., pl. xcvi, fig. 1.

It is short, and at its anterior end is attached to a long, straight cæcum (*c.r.p.*), given off at the main bend of the male organ. Near the base this is bent on itself into an S-shape connected by muscles. There is only an indication of a flagellum or kale-sac; the vas-deferens joins an oval enlargement, in which a short spermatophore is in process of formation, but as there are only two specimens I have not attempted to take it out. The amatorial organ is very stout and rounded at the posterior end, giving off a long retractor muscle; it has its attachment on the side of the body-cavity, and several strong, short muscles near the anterior end attach it to the floor of the foot just behind the buccal mass. The spermatheca is very short, of oval form, on a short stem. Since there is some importance in the relative position of the different parts of the genitalia, etc., when packed together in the body-cavity, I give drawings taken from above, and from the right and left and front sides. The penis is central and dorsal; the spermatheca, free oviduct, and part of the vas deferens appear on the right side; the amatorial organ is scarcely seen, since it rests on the side of the foot, and is hidden by the buccal mass and the capacious stomach.

The principal retractor muscles are well displayed. The main retractor of the right eye tentacle has its attachment on the right-hand side of the body-cavity, under the edge of the mantle-zone and right dorsal lobe. Another, broad one, shows beneath the last, on the right-hand side of body. This gives off two smaller muscles, attached near the margin of the mantle-zone.

The jaw is peculiarly straight, with only a very slight convexity on the cutting edge. It is solid and elongate, slightly more than four times longer than wide. The radula is broad, with about 100 rows of teeth, arranged thus :

145 : 17 : 1 : 17 : 145.

There is no very well marked line between the thirty-five central teeth and the laterals that follow. The rhachidian tooth and the admedians are long, broadly pointed, straight-sided; the succeeding marginals are curved, aculeate, and rounded at the point; at about the 130th tooth the marginals become bicuspoid, the inner cusp being the longer.

In its main characters, such as the mantle-lobes and the generative organs, this species agrees with *Nilgiria* and *Ariophanta*, and in points of detail is as near to *Nilgiria Chenui* as any other species. In the radula and jaw there is divergence, but the aculeate laterals have their counterpart in species of the *Ariophantinae*, such as *N. bistrialis*, *N. Ceylania*, *N. Chenui*, and *N. ganoma*, in which also the median band of teeth is broad; and *Ariophanta cysis*, *A. immerita*, *A. interrupta*, *A. bajadera*, and *A. intumescens*.

The peculiar characters which it does not share with these are—(1) the jaw, (2) the form of the central or median teeth, (3) the very smooth sole of the foot, (4) the pallial margin, (5) the shell. It appears to me these are sufficient data on which to found another subgenus of the *Ariophantinae*. The shell alone, in the eye of

a conchologist, could not stand in the same genus with such forms as *Ariophanta lævipēs* and *Nilgiria solata*. To this subgenus I give the name *Indrella*, from Indra of the Hindoo Pantheon.

## EXPLANATION OF PLATE XVIII.

- FIG. 1. Animal, viewed from the right side.  
 ,, 1a. Animal, viewed from above, showing the dorsal lobes and mantle margin.  
 ,, 2. Internal anatomy in natural position, seen from above. *A.* anterior, *P.* posterior ends of central axis of body.  
 ,, 2a. The same, viewed from the right side.  
 ,, 2b. The same, viewed from the left side.  
 ,, 2c. The same, viewed from the front.  
 ,, 3. Generative organs detached and separated out.  
 ,, 3a. The male organ from the opposite side.  
 ,, 4. Buccal mass.  
 ,, 5. Jaw.  
 ,, 6. Teeth of the radula—rhachidian and first admedian on either side.  
 ,, 6a. —central teeth, less highly magnified.  
 ,, 6b. —44th to 48th lateral teeth.  
 ,, 6c. —132nd to 136th lateral teeth.

- \* *am. or.* amatorial organ.  
*ant. l.d.l.* anterior left dorsal lobe.  
*c.r.p.* cæcum of the penis and retractor muscle.  
*gen. ap.* generative aperture.  
*k.* kalk-sac.  
*ot.* ovioteca (supposed).  
*œsoph.* œsophagus.  
*ov.* oviduct.  
*l.e.t.* left eye tentacle.  
*m.* retractor muscle.  
*m.l.e.t.* retractor muscle left eye tentacle.  
*post. l.d.l.* posterior left dorsal lobe.  
*sal. gland.* salivary gland.  
*sp.* spermatheca.  
*sper.* spermatophore.  
*r.m.* retractor muscle.  
*r.m.p.* retractor muscle of penis.  
*r.e.t.* right eye tentacle.  
*v.d.* vas-deferens.
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